Cranked Relativistic Hartree-Bogoliubov Theory: Formalism and Application to the Superdeformed Bands in the $A \sim 190$ Region

A. V. Afanasjev, P. Ring, and J. König

Cranked Relativistic Hartree-Bogoliubov theory without and with approximate particle number projection by means of the Lipkin-Nogami method is presented in detail as an extension of Relativistic Mean Field theory with pairing correlations to the rotating frame. Pairing correlations are taken into account by a finite range two-body force of Gogny type. The applicability of this theory to the description of rotating nuclei is studied in detail on the example of superdeformed bands in even-even nuclei of the $A \sim 190$ mass region. Different aspects such as the importance of pairing and particle number projection, the dependence of the results on the parametrization of the RMF Lagrangian and Gogny force etc. are investigated in detail. It is shown that without any adjustment of new parameters the best description of experimental data is obtained by using the well established parameter sets NL1 for the Lagrangian and D1S for the pairing force. Contrary to previous studies at spin zero it is found that the increase of the strength of the Gogny force is not necessary in the framework of Relativistic Hartree-Bogoliubov theory provided that particle number projection is performed. Nucl. Phys. **A676** (2000) 196, in print

Quadrupole Deformations of Neutron-drip-line Nuclei Studied within the Skyrme Hartree-Fock-Bogoliubov Approach

M. V. Stoitsov [a], J. Dobaczewski [b], P. Ring, and S. Pittel [c]

[a] Institute of Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, Sofia, Bulgaria

[b] Institute of Theoretical Physics, Warsaw University, Warsaw, Poland

[c] Bartol Research Institute, University of Delaware, Newark, USA

We introduce a local-scaling point transformation to allow for modifying the asymptotic properties of the deformed three-dimensional Cartesian harmonic oscillator wave functions. The resulting single-particle bases are very well suited for solving the Hartree-Fock-Bogoliubov equations for deformed drip-line nuclei. We then present results of self-consistent calculations performed for the Mg isotopes and for light nuclei located near the two-neutron drip line. The results suggest that for all even-even elements with Z=10–18 the most weakly-bound nucleus has an oblate ground-state shape. published in Phys. Rev. **C61** (2000) 034311 (1-14)

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Pseudo Spin-orbit Potential in Relativistic Self-consistent Models

S. Marcos [a], L. N. Savushkin [b], M. Lopez-Quelle [c], and P. Ring

[a] Departamento de Fisica Moderna, Universidad de Cantabria, Santander, Spain.

[b] Department of Physics, St. Petersburg University for Telecommunications, St. Petersburg, Russia

[c] Departamento de Fisica Aplicada, Universidad de Cantabria, Santander, Spain

The properties of the pseudo spin-orbit potential, in particular those related to its singularity structure, are investigated in the relativistic Hartree formalism. We have found a strong influence of the scalar mass and the compressibility modulus on the single-particle energy level ordering of the pseudospin doublet. published in Phys. Rev. **C61** (2000) 054309 (1-6)